UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/121,152	07/22/1998	STEVEN SAY-KYOUN OW	EDT101con	2999

23579 7590 06/23/2008

PATREA L. PABST
PABST PATENT GROUP LLP
400 COLONY SQUARE, SUITE 1200
1201 PEACHTREE STREET
ATLANTA, GA 30361

EXAMINER	
HUG, ERIC J	

ART UNIT	PAPER NUMBER
1791	

MAIL DATE	DELIVERY MODE
06/23/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

RECORD OF ORAL HEARING

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS

AND INTERFERENCES

Ex parte STEVEN SAY-KYOUN
and TAE JIN EOM

Appeal 2008-1297
Application 09/121,152
Technology Center 1700

Oral Hearing Held: April 17, 2008

Before EDWARD C. KIMLIN, BRADLEY R. GARRIS, and
KAREN M. HASTINGS, Administrative Patent Judges

ON BEHALF OF THE APPELLANT:

PATREA L. PABST, ESQUIRE
Pabst Patent Group
400 Colony Square
Suite 1200
Atlanta, Georgia 30361
(404) 879-2151
(404) 879-2160 - fax
Patrea@pabstpatent.com

ALSO PRESENT:

CAROLINE BURD
JIM TAUSCHE

The above-entitled matter came on for hearing on Thursday, April 17, 2008, commencing at 9:07 a.m., at the U.S. Patent and Trademark Office, 600 Dulany Street, Alexandria, Virginia, before Dawn A. Brown, Notary Registration No. 7066896, Notary Public.

THE CLERK: Calendar Number 44, Mrs. Pabst.

JUDGE KIMLIN: Good morning, Mrs. Pabst.

MS. PABST: Good morning.

JUDGE KIMLIN: Please begin when you're ready.

MS. PABST: In introduction, I'm Patrea Pabst. This is my associate, who is just here to learn, brand-new, Caroline Burd. And this is Jim Tausche, who is the CEO at Enzyme De-inking.

JUDGE KIMLIN: Welcome to you all.

MS. PABST: We appreciate the opportunity to be here. This is a case that has been around a long time. We hope we finally got our claims right, we hope we've got our evidence into taken, and demonstrate why this truly is novel and inventive, and it certainly has been commercially important.

We believe the main issue here, obviously, is obviousness. I don't have to tell you all the standard for obviousness looking at the scope and content of the prior art, the level of skill in the art, the differences and secondary considerations.

This is, in my opinion, an In re Sullivan-type case, the type where the federal circuit looked at what weight should be given to the evidence in the record that has been submitted to demonstrate nonobviousness.

As the Court said in their decision last August, if the examiner

makes a prima facie case of obviousness -- and I'm not sure they have, but we're not going to argue that this morning -- we have the right to rebut that with a showing of evidence supporting the opposite conclusion.

The evidence that is of record demonstrates that those of ordinary skill in the art at the time this application was filed believed that it was essential to have a pH greater than 8 in order to use the alkaline to expand the fibers.

And Mr. Tausche here gave a great example of this. He said think of it as a balloon with mud on it. When you blow up the balloon, it is easier to pop the mud off of it.

And that is exactly what the belief in the industry was, that you had to have that alkaline in order for the enzyme to assist in that removal. The declarations that we have submitted demonstrate what those skilled in the art would have understood at the time.

We also have submitted in response to -- I'm sure you all know part of the problem in this case is we had three examiners over the last couple of years and each time we tried to get back to where we were, and it got a little frustrating for everybody.

But we put in the second declaration of Howard Kaplan, in particular, was submitted to show not only that when you do this de-inking in the claimed pH range, between 3 and 8, that you achieve the same or better whiteness, but that difference, not adding the sodium hydroxide, allows these mills to save -- well, in 2006, the number was $1.9 million a year.

It is a huge difference in a business where the profit margin is not that large. The declaration gives the numbers for what it was at the time

the application was filed. They obviously have gone up between that time and the time that this declaration was submitted.

Those numbers are found in paragraph 8, page 4 of that declaration. Mr. Tausche informs me the numbers, of course, are higher now, in excess of $2 million in difference.

His company, Enzyme De-inking, focuses on the distribution and sale of these enzymes in the pulping industry. I have asked him to come in order to answer any technical questions or points that you might have that might need clarification from the brief and evidence of record.

I think I'll stop there and see if we have any questions.

JUDGE GARRIS: I might ask you to clarify that for me. First of all, the point you were making earlier that in the prior art, prior to this invention, it was thought that alkaline conditions were desirable or necessary in order to achieve de-inking. And that would raise, initially, the question of whether or not, in fact, your claim for setting the pH at 3 to 8 excluded alkaline conditions.

I understand that a high alkalinity condition is excluded by this claimed pH, but it seems to include at least somewhat alkaline conditions. So that raises the issue of whether, in fact, your claim includes to some extent the very types of conditions that you urge in your declarations and in your briefs are thought to be required in the prior art.

MS. PABST: That answer actually is addressed in the declarations that we have submitted.

Both -- they talk about what alkaline conditions were believed to be, which is in the range of 10 to 11, as well as if you look at Mr. Kaplan's declaration where he actually repeats the pH of the two examples in the

reference, the primary reference, the Japanese application, and measures that pH and shows that if you use the sodium hydroxide at the concentration that is described in the prior art, that the pH is between 10 and 11.

JUDGE GARRIS: Let me stop you there. I understand that example 2 of the Japanese reference was reproduced by Mr. Kaplan.

MS. PABST: Yes.

JUDGE GARRIS: And that it was his observation that the resulting pH was something between and 10 and 11.

MS. PABST: Well, he actually measured it exactly.

JUDGE GARRIS: I understand that. My point, however, is that in the other declarations they talk about what was considered to be known in the prior art. They simply indicated that alkaline conditions were thought to be needed, and that it was surprising that de-inking could occur in -- the phrase is -- nonalkaline conditions.

And so really then my question would be, does your claim limit itself to nonalkaline conditions?

MS. PABST: Our claim explicitly recites pH 3 to 8. The prior art describes alkaline conditions for swelling of the cellulose fibers.

The examples in the prior art cited by the examiner show a pH between 10 and 11, which is -- I've never been good at math -- 2 log factors -- a hundred log factors higher than the claimed pH range. From a practical standpoint, and I think you probably know enzymes quite well, that is a huge difference in terms of both a material response to a pH as well as what enzymes will do.

What I'm going to do is ask Mr. Tausche to respond as well. I believe that is what the prior art that is of record in this case shows and that

we have put in the evidence that says just as -- you know we've met the criteria that the Supreme Court laid out in KSR.

What is the scope and content of the prior art in the level of ordinary skill in the art? How would those skilled in the art interpret that prior art?

They would not interpret the prior art as between 3 to 8. They would interpret it based on the ordinary understanding of what the industry was using at the time this application was filed.

We had put in a great deal of additional prior art. For example, the paper that neutral de-inking makes it debut, which also talks about what those skilled in the art thought was meant by alkaline conditions versus what they now call neutral de-inking, less than pH 8.

MR. TAUSCHE: You know, the pH scale, as you all are aware, up to 14 is a logarithmic calculation. Neutral is generally considered 6 to 8. It is not 7 to 7. It is 6 to 8. So most people in our industry when they talk about neutral de-inking are talking about things 8 and above.

MS. PABST: 8 and below.

MR. TAUSCHE: 8 and below. The alkaline is 8 and above. The traditional way of doing this you wouldn't even get close to 8. 1 percent caustic is a typical addition. It is a 50 percent strength of caustic, and you're going to shoot up to 10, 11 every single time. Even the 8 range is not something that would have been practiced in the art.

JUDGE KIMLIN: Does the declaration evidence afford a comparison between pHs of 8 and 10 or 8 and 11.

MS. PABST: We provided direct comparative evidence of with and without the addition of the sodium hydroxide. And if we could look at

Mr. Kaplan's second declaration -- and I've forgotten which examiner now -- but one of the examiners -- we submitted a first declaration, and we got a new examiner. And they came back and said, well, we want to know what your pHs were exactly.

So what we had here was in paragraph 4 where the person at Enzyme De-inking took that example with and without the sodium hydroxide, and the pH of the reaction mixture after stirring was 7.5.

Now, these were repeated ten times. When you added the sodium hydroxide, the pH was 10.59, 10.67, 11.16, 11.12 and so forth. Again, this was done just a couple of times in the first comparative studies.

The examiner requested statistically significant tests and statistical significance between the outcomes of the two, and that is what the second declaration shows. So that the pH with the addition of nothing for this reaction mixture is about 7.5 to 7.6.

JUDGE KIMLIN: And you have a comparison of that with the --

MS. PABST: With the example 2, which is the .1 sodium hydroxide, which takes it above 10. This was a direct comparison.

Now, there was only one difference in example 2 in the comparison that was studied, which was that the original enzymes prescribed in that application were no longer available, so a comparable cellulase was used.

But as far as the chemical conditions and the materials and everything else and the measurements were all exactly the same, and it was repeated, not just the ten times in the second study, but as well as the first study to show these differences were statistically significant.

One of the things the examiner raised was, Well, it doesn't look to me like .7 is a huge difference. As Mr. Tausche, he can tell you, in an industry where very, very small amounts are important, that actually is important. But from a standpoint of what everybody can understand from a commercial standpoint, saving $2 million a year is a very significant difference.

And it comes down to if this was so obvious at the time this thing was filed, every mill in the world would have not been adding sodium hydroxide.

JUDGE KIMLIN: Which leads me to the question: What is happening here that is giving us results that are so contrary to what was accepted in the art since pH is such an easily controlled factor and something that in the patent world we say we can alter with just routine experimentation and optimization? Is there a mechanism that is happening that was not recognized before?

MS. PABST: I'm deferring to the expert here.

MR. TAUSCHE: Yeah. There are many industries where lore drives what is done. Paper recycling is a good example. Paper has been recycled for roughly a hundred years, and paper is actually a fairly complex matrix.

You have fibers that web together. You have inks that stick on them. You have fillers that are inside, then you have coatings that are on top. And in order to de-ink effectively, all of that has to be separated.

And caustic is a wonderful chemical. It can dissolve many of those coatings, it can help swell the fibers, as Patrea mentioned. When you swell things apart, much like that balloon metaphor, it does pop things off.

Pulp and paper industry is one where it takes an awful long time to adopt a new thought.

You can look at many examples of kraft bleaching where an invention might have taken a quarter of a century to be adopted. Perhaps in computers you might say a great idea people would experiment and they would try to do something quite readily, the pulp and paper industry it is not the case.

Caustic just happens to be a very good material to swell fibers, dissolve coatings, which are like the cement that holds things together, and begin the process of disassociating the contaminants from the fibers that you want. Mills just didn't do this and did not try this.

MS. PABST: How does the enzyme work without it?

MR. TAUSCHE: The enzyme lever is a very different mechanism to do this, and it is a surprising mechanism. Industrial enzymes also are a fairly new science. These are not materials you would be buying.

I think industrial enzymes were first used in the detergent industry, and even that wasn't so many years ago. There is a very newness to the raw materials and the ability to do this like in any new science that is being developed.

MS. PABST: Is there some advantage that caustic brings that your process is not obtaining because it does not have a caustic in there, like the enzyme is removing the ink but possibly not other coatings or fillers or whatever?

MR. TAUSCHE: There are no benefits that don't relate to our -- I'm sorry. There are no benefits that relate to our patent.

For example, caustic is still very valuable if you have wet

strength. This has nothing to do with our patent. Wet strength is a material, it is a plasticizer, that you would add to paper, such as a beverage carton, so it doesn't fall apart when your Coke can or your beer can gets wet.

Today, still, caustic is used -- hypochlorite is used to disassociate those plastics. That is not de-inking; that has a different issue of re-pulping plasticized materials.

JUDGE KIMLIN: I mention that because you were talking about how complex the fibers are of the -- you know, the printed paper and just wondering if the caustic had all these advantages. Were you gaining one advantage and maybe losing another by not having a caustic?

MS. PABST: I think that is one of the things that is so surprising about these results is the fact that you can have this cost savings. So like with newsprint and recycled regular paper that doesn't have the plastic coatings, that is what is surprising.

That is what Mr. Kaplan's declaration shows that is just staggering in some ways. That is what we were trying to explain to the examiner is the results show it is just as good if not better to not use this caustic, which ups the cost per year per mill to $2 million.

The whiteness is almost -- it is as good if not better. It is cheaper. It is totally contrary to what people in the industry at the time this was filed were using.

So what Jim is trying to say now is there are going to be materials still where you need to use the caustic, but for this huge aspect of the industry when you're taking newsprint and I know law firms put in enough paper to kill a forest every year, it is a great resource.

It also has advantages with respect to disposal, it is more

environmentally friendly, and I see I am kind of running out of time.

MR. TAUSCHE: Another issue to address the question. Caustic used to be very much less expensive than today. It is an energy-related material. Mills used to be very open, so they didn't care about issues like COD and BOD, but the environmental constraints on recycling have grown over time.

So I think if you were to jump 30 years ago and think about caustic, a mill person would have said it works really well, it is cheap as can be, no one is monitoring the effluent. A very different environment than today.

JUDGE GARRIS: Before we wrap this up, I want to specifically address the Kaplan II declaration that you alluded to. In it, of course, you make this comparison between an embodiment -- a somewhat modified embodiment of an example to the Japanese reference. You weren't able to obtain the specific enzyme.

MS. PABST: We made great efforts.

JUDGE GARRIS: You used an equivalent instead and compared it to your invention, which unlike example 2, did not use sodium hydroxide.

In addition, however, there is another difference, and that is that the enzyme you used, of course, was different. And so I guess I would point -- I'm looking here in the paragraph in the Kaplan II declaration where you were using an alkaline cellulase to represent an example to the Japanese reference.

It has got an alkaline cellulase. It is active over a range of 4 to 10. It has a pH optimum of 8. And that is what you use for your

comparison. For your invention, you use this different enzyme that has an optimum pH between 6.5 and 7.5.

MS. PABST: Yes.

JUDGE GARRIS: Is that a difference we should be concerned about? In other words, will using different enzymes give a different result in terms of de-inking, the whiteness of the product, et cetera?

MS. PABST: Anyone in the enzyme industry is going to select an enzyme that has an optimal activity at the pH of what is used. So what this experiment did was it biased the results in favor of success for both samples. They used an enzyme that had the maximum activity at the pH used with the sodium hydroxide and it used a cellulase at the optimal activity at the pH for the other one.

So both samples were biased for maximal success by selecting an enzyme that worked best at that pH. But, I mean, I would be hard pressed to argue that selecting an enzyme that, you know, that you look at -- I mean, anybody who could have pulled out a SIGMA catalog knows that it says where pH optimal is.

And I think that is pretty routine that part, but that was done with both halves of these, picking an enzyme that would work absolutely the best at the pH at which it was used.

JUDGE GARRIS: I raise this issue because it may relate to the examiner's concern that your declaration evidence is not commensurate in scope to the claim.

I point out, for example, that the comparison alkaline cellulase that you're using in the -- you got in the Kaplan II declaration says that the pH optimum is 8.0. Well, of course, that is at the top end of your claimed

range. And so the question might be --

MS. PABST: It is probably 8.0.

JUDGE GARRIS: -- what would happen if, in fact, you use that exact same alkaline cellulase for the comparison and for the invention wherein the comparison, of course, uses sodium hydroxide and the invention does not?

MS. PABST: The purpose of the comparison according to the examiner who originally requested this was to show that we have better results in the mechanism. It wasn't -- it was never a question of whether it worked over the pH range of 3 to 8.

That was not the question. The question was to compare de-inking with the end pH of 3 to 8 with nothing else added, which made it very difficult to do a range of pH because, as the example was set up, the only way you could drop that pH would have been to add hydrochloric acid in, which would have been a variable because acid just as caustic could have been argued to alter the results.

So we were asked to compare with and without sodium hydroxide, and there was no way to do this any other way. And, I mean --

JUDGE GARRIS: I've just suggested another way, and that is to use the same cellulase for both the comparison as well as the --

MS. PABST: But nobody would do that. Again, we go back to what the Court said in In re Sullivan.

JUDGE GARRIS: Why do you say that?

MS. PABST: People in the enzyme field know -- and this has been known for so long that it was known when I worked in a lab, which was a really long time ago -- you know to pick the enzyme that is going to

work best at your pH.

JUDGE GARRIS: You're using in your comparison an enzyme of an optimum pH at 8. Your claim includes a pH of 8 --

MS. PABST: The claim recites --

JUDGE GARRIS: -- so why not use that same enzyme for the comparison.

MS. PABST: -- doing the de-inking at a pH between 3 and 8.

MR. TAUSCHE: Our goal in this experiment was to use an enzyme. It is an alkaline cellulase. We were trying to replicate --

MS. PABST: Which is what was described in the Japanese reference, an alkaline cellulase.

JUDGE GARRIS: It seems like it is, likewise, an enzyme encompassed by your claim.

MS. PABST: It doesn't matter if it is encompassed by our claim. The whole point of our claim and what we have been trying to correct for a long time to make that claim clear was that our claim recites the reaction condition of between pH 3 and 8. That is what our claim defines.

The Japanese reference describes de-inking with sodium hydroxide, which is a pH between 10 and 11 in those samples. So it doesn't matter if we had used an alkaline cellulase, an acidic cellulase, or whatever. The reaction conditions are between 3 and 8, which is what our claim defines.

The prior art discloses a much higher pH. The evidence of record shows that those skilled in the art believe that that higher pH was critical to success. Our evidence shows that it can work at a lower pH.

JUDGE GARRIS: I guess your point then is that the use of a --

it doesn't matter, I think you said, that different enzymes are used in this comparison. It is, in fact, the pH that matters.

MS. PABST: Our claims were drawn. The difference we focused our claims on that was not in the claims before was the reaction conditions.

JUDGE GARRIS: I think the issue might raise itself as to whether, in fact, you've got evidence that establishes that it doesn't matter what enzyme is used; it only matters what pH is used.

MS. PABST: There is no question that which enzyme you use will affect the outcome.

The prior art, which forms the basis of the obviousness rejection, teaches de-inking at a very high pH because as evidenced by the declaration of record and the papers that have been submitted during the course of prosecution, those skilled in the art at the time this application was filed believed it was critical to add sodium hydroxide to a concentration that elevated the pH to 10 to 11.

The Japanese patent application that forms the primary reference in this case said we can add enzyme and get better results. We are not arguing that that is not an accurate statement; we are not saying they're wrong.

We're not saying that when they say that you should use an alkaline cellulase is preferred is wrong. Of course it is right because they were working in very alkaline conditions and those skilled in the art would know to use an enzyme with optimal activity at the pH they used.

What we're claiming and what is so different is de-inking at a pH between 3 and 8, and those skilled in the art would know to use an

enzyme that has optimal activity at the pH at which the reaction is run.

JUDGE KIMLIN: Well, it seems, then, that one skilled in the art would know to select the enzyme under the pH conditions that are being employed and that you would expect that if you used pH conditions that were alkaline, you're going to use an alkaline-active enzyme and vice versa. So if you're going to operate in acidic conditions, you're going to use that particular enzyme.

MR. TAUSCHE: That is what we used in experiment too. Are you questioning whether this is obvious or whether it works? I'm kind of confused.

JUDGE KIMLIN: What we're discussing here is the commensurate and scope. How broad are these claims? Is your invention specific to particular enzymes or any enzyme that is going to work?

MR. TAUSCHE: It is enzymes that facilitate the detachment of ink below pH 8, which was surprising and nonobvious.

JUDGE KIMLIN: That sounds more specific. That sounds like it is not including enzymes that work better in alkaline conditions.

MS. PABST: If you pick up any catalog with enzymes, it is going to tell you the pH optimum. So it was routine to pick -- what they did was -- I mean, the thing is we are not adjusting the pH of these reacting conditions. So if you have recycled material that is a little more acidic, it is going to be a little lower. If you pick newsprint, it turned out it was around 7-something.

Your pH is going to be dependent on what your paper source is and then you know what enzymes to add. What was inventive here and what is totally unexpected and totally contrary to the prior art, and that is what all

of this evidence shows and which we certainly believe meets the criteria under In re Sullivan is that the prior art said enzymes could help.

There is no prior art that even remotely indicates that you could do this de-inking with an enzyme at a pH of less than eight. It all says that that sodium hydroxide was critical to take and swell these fibers. That is what Schmidt says. That is what all the prior art says.

MR. TAUSCHE: When neutral de-inking makes it debut was three years after the relevant date here. That was an earth-shaking event. Nobody has done that anywhere. That is all we're trying to argue.

MS. PABST: There was huge economic incentive to do this. So if it was so obvious, hey, we can drop the caustic and that solves our environmental problems and will work just as well. But, in fact, if you asked anybody at the time this was filed, you think you can do this without caustic? The answer would have been no.

JUDGE KIMLIN: What it sounds, to me anyway, is that your invention, is it would be nice if we could operate without a caustic. Are there any enzymes out there that would operate without a caustic?

MS. PABST: The answer is of course.

JUDGE KIMLIN: That is what your invention seems.

MS. PABST: The invention is the discovery that this will work because everything in the prior art says it wouldn't.

JUDGE KIMLIN: My point is it does seem to be enzyme-specific. Correct me if I'm wrong, but if you take the prior art enzymes that are operated in alkaline conditions, you wouldn't expect them to really work well in this system without a caustic.

MS. PABST: There are say -- any catalog will show you this.

There are enzymes out there that work over a broad pH range.

JUDGE KIMLIN: Right.

MS. PABST: There are enzymes that have specific pH ranges. So you could find a so-called alkaline cellulase that would work just find at this pH. So it is not --

MR. TAUSCHE: I think all Judge Kimlin is saying is you wouldn't use an alkaline enzyme --

MS. PABST: You wouldn't use an enzyme that only worked at a pH -- at a low pH.

MR. TAUSCHE: -- if you had made the decision on an experiment with neutral or low pH.

JUDGE KIMLIN: If you're going to practice your invention, you're not going to select an alkaline enzyme.

MS. PABST: You aren't going to select an enzyme that only works at pH 10. That part is true. But there are many -- cellulase in particular are pretty pH-tolerant. That is the business they're in; it is selling enzymes.

They have gone through and optimized which enzymes are going to work best under which conditions. They go into plants, they test these enzymes, and they optimize to get the maximum results. That is their company.

MR. TAUSCHE: We have three dozen mills around the world using this technology. We are the pioneer and leader in this field. This is very new stuff. Nobody was doing this.

That article we submitted as a declaration about neutral de-inking makes its debut is absolutely right. That was in a leading industry

journal. We have a declaration from the technical person in charge of that mill. These things were not done when this application was filed.

MS. PABST: That is what -- we really think that -- again, I think we have to keep coming back to what is the legal standard here?

And we have put in a lot of evidence that says that the level of skill was high, that those in the industry believed you had to add a high concentration of sodium hydroxide, which was critical. We have a prior art reference that said you could add an enzyme that will make it work better.

We're different. We're claiming doing this at a pH where there isn't any added sodium hydroxide and saying this can work as well or better. It can save a great deal of money on the current market conditions, about $2 million a year for these mills, and it avoids many of the environmental problems associated with the use of sodium hydroxide. This was unexpected.

JUDGE KIMLIN: I think we understand the issues.

MS. PABST: Thank you very much.

MR. TAUSCHE: Thank you very much.

JUDGE KIMLIN: Thank you for coming.

(Whereupon, the proceedings at 9:41 a.m. were concluded.)